We claim:

1. A burnable used oil fuel product by the process comprising:

(a) obtaining a used oil sample having at least 1% (by weight) aqueous substances;

(b) heating the used oil sample to a temperature of from about 20 °C to about 60 °C; and

(c) extracting a volume of water from the heated used oil by adding super critical CO_2.

2. The burnable used oil fuel product of claim 1 wherein the used oil sample has at least 6% (by weight) of aqueous substances.

3. The burnable used oil fuel product of claim 1 wherein the heating the sample step is accomplished by a microwave heating process.

4. The burnable used oil fuel product of claim 3 wherein the microwave heating energy is about 2.45 GHz.

5. The burnable used oil fuel product of claim 1 wherein the extraction step is performed in a trapping vessel having a bottom valve for removing bottom components and a means for regulating pressure, whereby water and extracted solid constituents are removed from the bottom vessel. NAB

6. The burnable used oil fuel product of claim 1 wherein the process further comprises settling the demulsified oil to allow for water and extracted solids to settle. NAB

7. A process for recovering burnable used oil fuel from a used oil sample, process comprising:

(a) obtaining a used oil sample having at least 1% (by weight) aqueous substances;

(b) heating the used oil sample to a temperature of from about 20 °C to about 60 °C; and

(c) extracting a volume of water from the heated used oil by adding super critical CO_2.

8. The process for recovering burnable used oil fuel from a used oil sample of claim 7 wherein the heating the sample step is accomplished by a microwave heating process.

9. The process for recovering burnable used oil fuel from a used oil sample of claim 8 wherein the used oil sample has at least 6% (by weight) of aqueous substances.

10. The process for recovering burnable used oil fuel from a used oil sample of claim 9 wherein the microwave heating energy is about 2.45 GHz. FREQ INCORRECT - FREQ.

11. The process for recovering burnable used oil fuel from a used oil sample of claim 7 wherein the extraction step is performed in a trapping vessel having a bottom valve for removing bottom components and a means for regulating pressure, whereby water and extracted solid constituents are removed from the bottom vessel. NAB

12. The process for recovering burnable used oil fuel from a used oil sample of claim 7 wherein the process further comprises settling the demulsified oil to allow for water and extracted NAB

solids to settle.

13. An apparatus for purifying waste oil, comprising:

(a) a preprocessing analyzer section connected to an input stream for waste oil and an output;

(b) a preprocessing switch controlled by the analyzer section having an input connected to an analyzer section output and an output, the preprocessing switch having a first output and a second output;

(c) a heating section connected to the preprocessing switch output; and a microwave heating section connected to the second output; and

(d) a demulsification section connected to the heating output and having an output lower for settling.

14. The apparatus for purifying waste oil of claim 13 wherein the apparatus further comprises a preheating section connected upstream of the preprocessing switch.

15. The apparatus for purifying waste oil of claim 13 wherein the heating section comprises both resistance heating and microwave heating.

16. The apparatus for purifying waste oil of claim 15 wherein the microwave heating section comprises a waveguide and a slurry conduit extending through a portion of the waveguide.

17. The apparatus for purifying waste oil of claim 15 wherein the waveguide includes a straight member between a first end and a second end, the first end is a curved member having a 45 "H" -plane bend of miter construction.

18. The apparatus for purifying waste oil of claim 13 wherein the apparatus further comprises a post-processing analyzer section connected to a demulsifier output, and a post-processing switch connected to a post-processing analyzer section output of the post-processing analyzer section.

19. An apparatus for purifying waste oil, comprising:

(a) a pump connected to the supply of waste oil creating a waste oil steam;

(b) a microwave heating section heating the waste oil stream to form a heated oil stream; and

(c) a demulsification section having a super critical CO_2 inlet and a settling outlet lower than the inlet and connected to the microwave heating section.

20. The apparatus for purifying waste oil of claim 19 wherein the apparatus further comprises an analyzer section that determines a percentage of water in the waste oil stream feed.

21. The apparatus for purifying waste oil of claim 19 wherein the microwave heating section comprises (a) a microwave generator; (b) a single mode waveguide connected to the microwave generator; and (c) a slurry running through the single mode waveguide.

22. The apparatus for purifying waste oil of claim 21 wherein the microwave heating section further comprises a sensor connected to the microwave generator and for determining an amount of reflected energy.